ago and called by a less provincial name, the "Pomologie Française."

F. A. W.

SPECIAL ARTICLES

COMPARISON OF THE CATALASE CONTENT OF THE BREAST MUSCLE OF WILD PIGEONS AND OF BANTAM CHICKENS

It is now generally accepted that the energy for muscular work is derived from oxidation of the food materials, although physiologists are not agreed as to the means by which the body accomplishes this oxidation at such a low temperature as 39° C., the temperature of the body.

The present investigation was carried out to determine if catalase, an enzyme which liberates oxygen from hydrogen peroxide or from an organic peroxide comparable in structure to hydrogen peroxide, is greater in amount in the breast muscles of wild pigeons accustomed to flying than it is in the breast muscle of bantam chickens not so accustomed; if the catalase content of the breast muscles of the pigeons would be decreased by decreasing the amount of work done by these muscles, and if it would be increased in the breast muscles of the chickens by increasing the amount of work done.

After several wild pigeons and bantam chickens had been washed until free of blood by the use of large quantities of 0.9 per cent. sodium chloride, as was indicated by the fact that the wash water gave no test for catalase, the breast muscles were removed and ground up separately in a hashing machine. One gram of this material was added to 50 c.c. of hydrogen peroxide in a bottle at 22° C., and as the oxygen gas was liberated it was conducted through a rubber tube to an inverted burette previously filled with water. After the volume of oxygen gas, thus collected in ten minutes, was reduced to standard atmospheric pressure the resulting volume was taken as a measure of the amount of catalase in the gram of material. It was found that one gram of the breast muscle of the wild pigeons liberated on an average, 98 c.c. of oxygen, while that of the bantam chickens liberated only about 8 c.c., hence, the amount of catalase in the breast muscle of the wild pigeons is much greater than that of the bantam chickens.

Several wild pigeons were confined for three weeks in individual small cages so that they could not use their breast muscles in flying, while several bantam chickens were made to run and fly until they were almost exhausted once a day for fifteen days. The catalase of the breast muscles of these pigeons and chickens was determined as in the preceding. It was found that confinement decreased the catalase content of the breast muscles of the pigeons by about 40 per cent., while exercise increased that of the breast muscles of the bantam chickens by almost 25 per cent.

The fact that an increase or decrease in the amount of work, and hence in oxidation in a muscle, is accompanied by a corresponding increase or decrease in the amount of catalase, would seem to suggest that catalase may play a rôle in the oxidative processes of the body.

W. E. Burge

Physiological Laboratory of the University of Illinois

CILIA IN THE ARTHROPODA

That cilia are absent in the Arthropoda is an assumption which has crept into our zoological literature. Thus, Adam Sedgwick in his "Student's Text-Book of Zoology," Vol. III., 1909, pp. 316–317, says: "These ducts in the female[1] retain a ciliated lining (Gaffron), the only known instance of the occurrence of a ciliated tract among the Arthropoda." Then again, we read in Parker and Haswell's "Text-Book of Zoology," Vol. I., (revised edition), 1910, p. 526, as follows: "Arthropods are also characterized by the almost universal absence of cilia." Kingsley, on page 357 of his revised edition of Hertwig's "Manual of Zoology," 1912, makes the following assertion concerning cilia in the Arthropoda: "The entire absence of cilia is noteworthy. Ciliated cells have never been found in arthropods." Still another zoologist, J. Arthur Thomson in the fifth, revised edition of his

[1] Sedgwick is discussing ducts in the female reproductive organs of *Peripatus*.